



# STPS20L45CF/CW/CT/CFP/CG

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAJOR PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
$V_{RRM}$	45 V
$T_j$ (max)	150°C
$V_F$ (max)	0.5 V

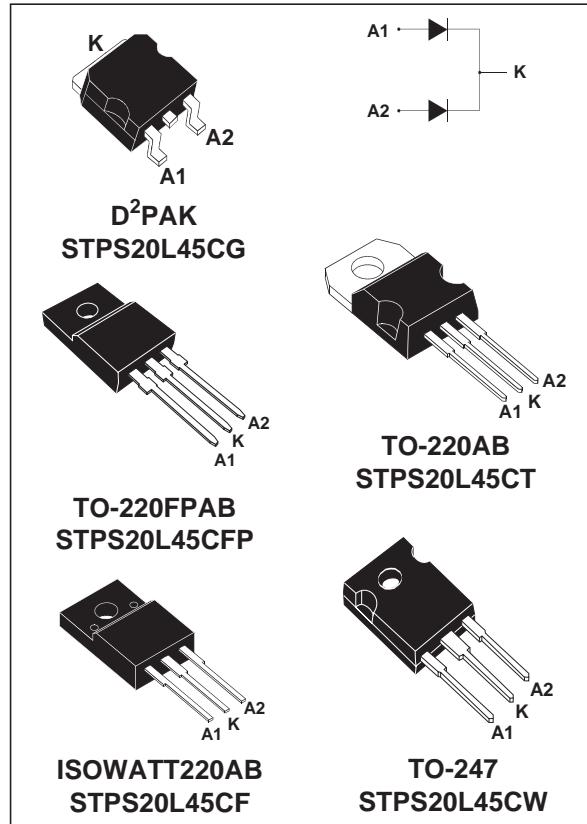
### FEATURES AND BENEFITS

- LOW FORWARD VOLTAGE DROP MEANING VERY SMALL CONDUCTION LOSSES
- LOW SWITCHING LOSSES ALLOWING HIGH FREQUENCY OPERATION
- INSULATED PACKAGE: ISOWATT220AB, TO-220FPAB  
Insulating voltage = 2000V DC  
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

Dual center tap Schottky rectifiers designed for high frequency switched mode power supplies and DC to DC converters.

These devices are intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter				Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage				45	V
$I_{F(RMS)}$	RMS forward current				30	A
$I_{F(AV)}$	Average forward current	TO-220AB / D <sup>2</sup> PAK	$T_c = 135^\circ\text{C}$	Per diode	10	A
		TO-247	$\delta = 0.5$	Per device	20	
$I_{FSM}$	Surge non repetitive forward current	ISOWATT220AB TO-220FPAB	$T_c = 115^\circ\text{C}$	Per diode	10	A
			$\delta = 0.5$	Per device	20	
$I_{RRM}$	Surge non repetitive reverse current	tp = 10 ms Sinusoidal			180	A
$I_{RSM}$	Peak repetitive reverse current	tp=2 $\mu\text{s}$ square	F=1kHz		1	A
$P_{ARM}$	Non repetitive peak reverse current	tp = 100 $\mu\text{s}$ square			2	A
$T_{stg}$	Repetitive peak avalanche power	tp = 1 $\mu\text{s}$	$T_j = 25^\circ\text{C}$		4000	W
$T_j$	Storage temperature range				- 65 to + 150	$^\circ\text{C}$
$dV/dt$	Maximum operating junction temperature *				150	$^\circ\text{C}$
	Critical rate of rise of reverse voltage				10000	V/ $\mu\text{s}$

\* :  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th}(j - a)}$  thermal runaway condition for a diode on its own heatsink

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### THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	ISOWATT220AB TO-220FPAB	Per diode	4.5	°C/W
			Total	3.5	
			Coupling	2.5	
$R_{th(j-c)}$	Junction to case	TO-247	Per diode	2.2	°C/W
			Total	1.20	
			Coupling	0.3	
$R_{th(j-c)}$	Junction to case	TO-220AB D <sup>2</sup> PAK	Per diode	2.2	°C/W
			Total	1.3	
			Coupling	0.3	

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(j-c)}$$

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

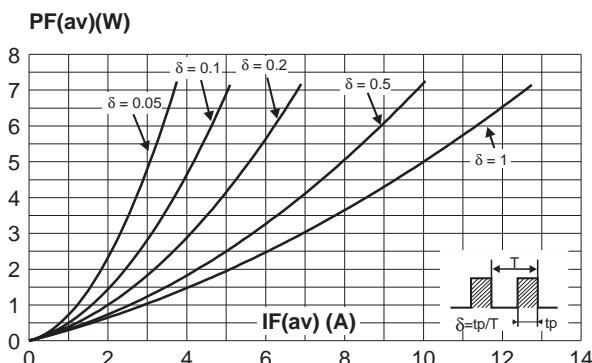
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
$I_R$ *	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			0.2	mA
		$T_j = 125^\circ\text{C}$			65	130	mA
$V_F$ *	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$			0.55	V
		$T_j = 125^\circ\text{C}$	$I_F = 10 \text{ A}$			0.44	
		$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$			0.73	
		$T_j = 125^\circ\text{C}$	$I_F = 20 \text{ A}$			0.62	

Pulse test : \*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

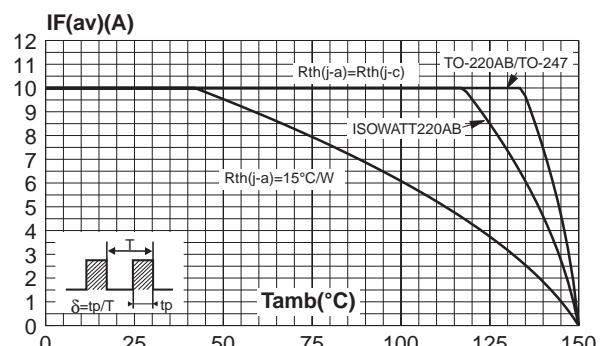
To evaluate the conduction losses use the following equation :

$$P = 0.28 \times I_{F(AV)} + 0.022 I_{F}^2(\text{RMS})$$

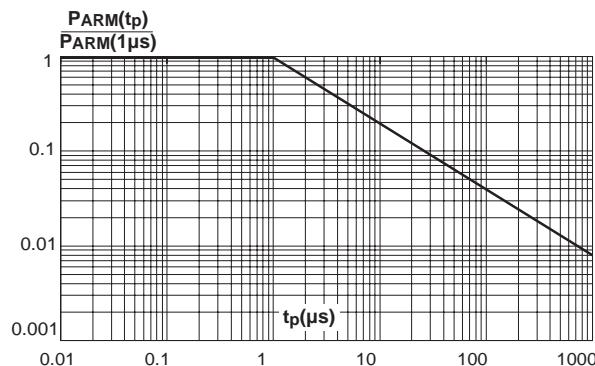
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



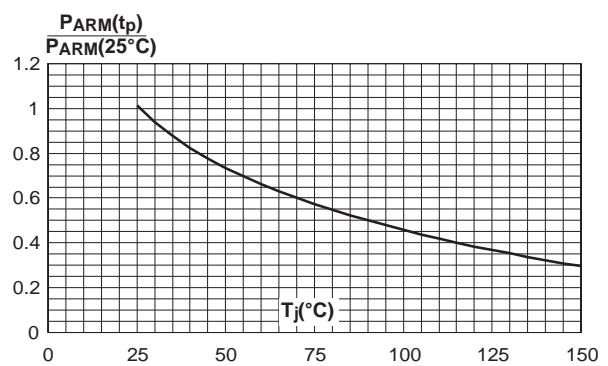
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode).



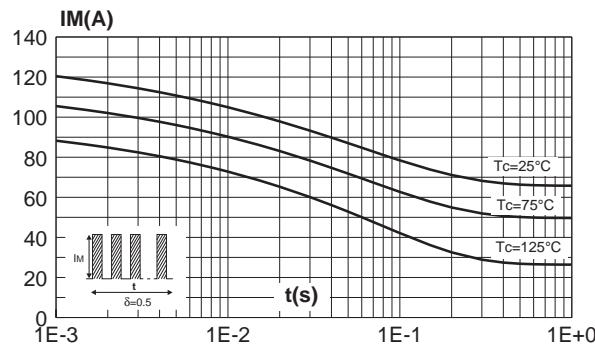
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



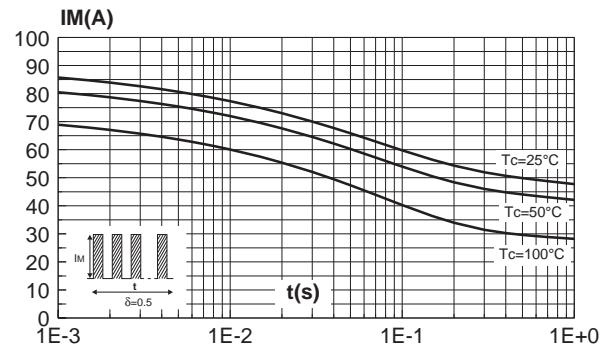
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



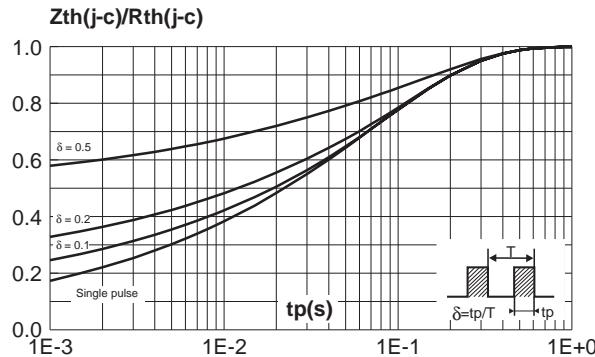
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode, TO-220AB, TO-247, D<sup>2</sup>PAK).



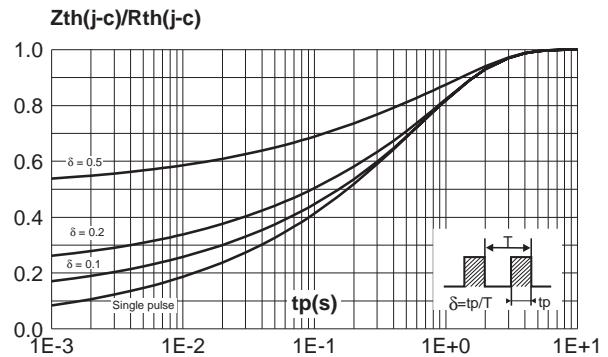
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration (maximum values, per diode, ISOWATT220AB, TO-220FPAB).



**Fig. 6-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, TO-247, D<sup>2</sup>PAK).

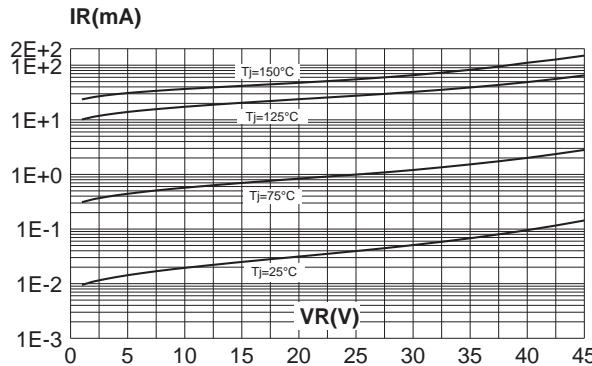


**Fig. 6-2:** Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

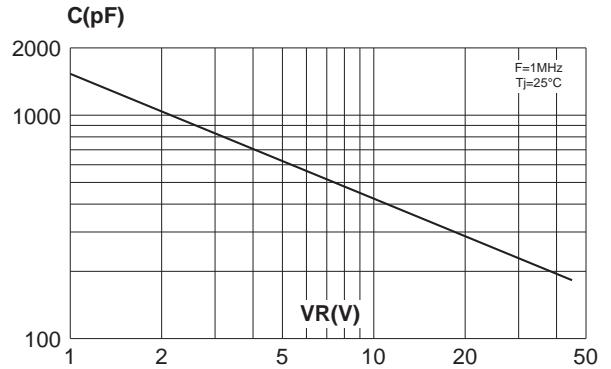


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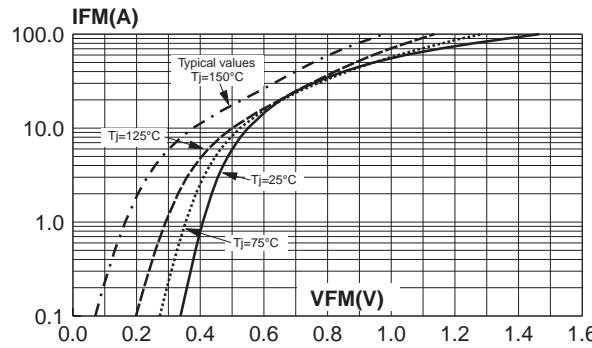
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values, per diode).



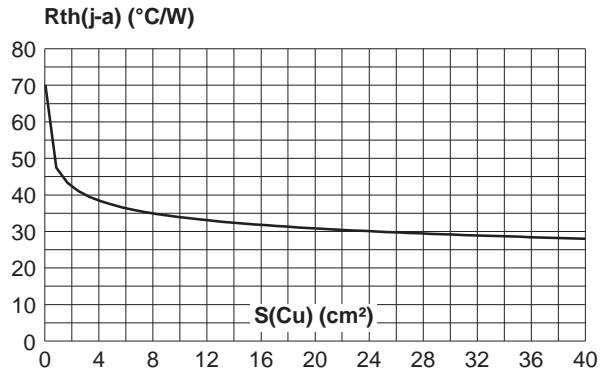
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values, per diode).



**Fig. 9:** Forward voltage drop versus forward current (maximum values) (per diode).



**Fig. 10:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35µm) (D<sup>2</sup>PAK).



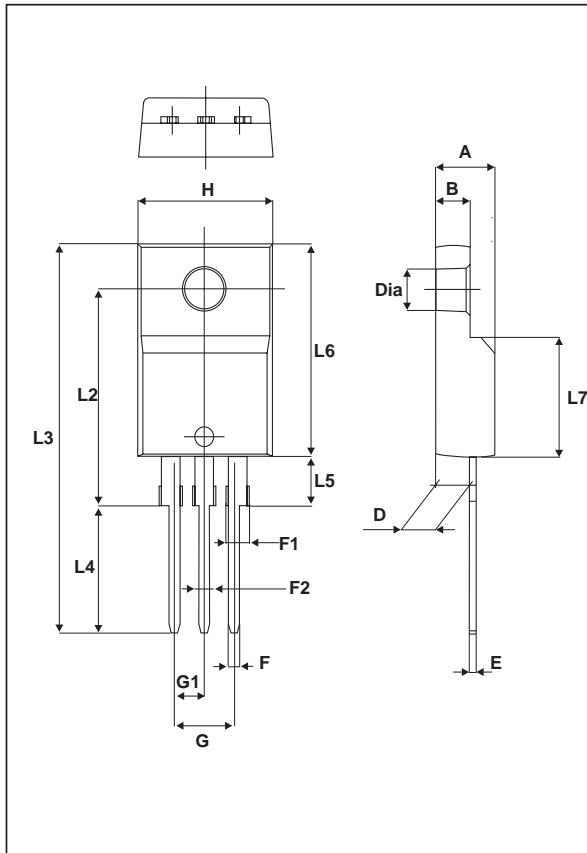
**PACKAGE MECHANICAL DATA**  
**ISOWATT220AB**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.40	0.70	0.016	0.028
F	0.75	1.00	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.40	2.70	0.094	0.106
H	10.00	10.40	0.394	0.409
L2	16.00 typ.		0.630 typ.	
L3	28.60	30.60	1.125	1.205
L4	9.80	10.60	0.386	0.417
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

- Cooling method : C
- Recommended torque value : 0.55 m.N
- Maximum torque value : 0.70 m.N

## STPS20L45CF/CW/CT/CFP/CG

### PACKAGE MECHANICAL DATA TO-220FPAB



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

- Cooling method : C
- Recommended torque value : 0.55 m.N
- Maximum torque value : 0.70 m.N

**PACKAGE MECHANICAL DATA**  
TO-220AB

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

- Cooling method : C
- Recommended torque value : 0.55 m.N
- Maximum torque value : 0.70 m.N

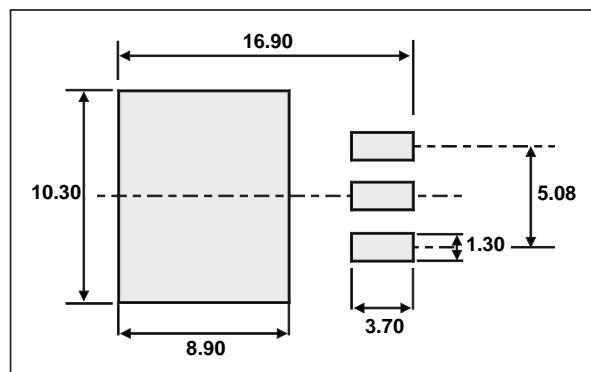
## STPS20L45CF/CW/CT/CFP/CG

### PACKAGE MECHANICAL DATA D<sup>2</sup>PAK

\* FLAT ZONE NO LESS THAN 2mm

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

### FOOTPRINT



**PACKAGE MECHANICAL DATA**  
TO-247

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

- Cooling method : C
- Recommended torque value : 0.8m.N
- Maximum torque value : 1.0m.N

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS20L45CF	STPS20L45CF	ISOWATT220AB	2.1g	50	Tube
STPS20L45CFP	STPS20L45CFP	TO-220FPAB	2g	50	Tube
STPS20L45CT	STPS20L45CT	TO-220AB	2g	50	Tube
STPS20L45CW	STPS20L45CW	TO-247	4.4g	30	Tube
STPS20L45CG	STPS20L45CG	D <sup>2</sup> PAK	1.48g	50	Tube
STPS20L45CG-TR	STPS20L45CG	D <sup>2</sup> PAK	1.48g	1000	Tape & Reel

- Epoxy meets UL94, V0

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